Cell types of epidermis

Cells in Synthesis or Degeneration Phase

1. Keratinocytes
- Principal cell type of all 5 layers → Continuous renewal → prevents passage of substances → Keratinization Regulated by fibronectin in BM
- Ectoderm derived → Differentiation (Cytomorphosis, creates 5 distinct layers) → 3-4 weeks for cell to migrate, due to keratinization process
- Produce large amounts of keratin → fibrous proteins, increase as cell migrates to surface
- Desmosomes and Hemidesmosomes
- Epidermal Proliferation Unit (EPU) → Stem cell plus all progeny vertically → One stem cell to 10-12 basal cells at rate of ~ one per day
- Secretion of Glycolipids, and involucrin → Waterproof layer (cytomorphosis)

2. Melanocytes
- Pigmented → Normal → 800-1000 melanocytes
- Pigmented → 2000 melanocytes
- DEVO: Neurectoderm -> dermis (6 wks), Epidermis (10 wks), Fetus has 2,300 melanocytes at 3 months, normal #s by birth
- Stratum basale
- Neural Crest cell derived
- Tyrosinase (Tyrosine --> Melanin) → Increased activity in tanning = darkening of melanin
- Premelanosomes in golgi, produces tyrosine, Stratum basale and spinosum → Melanosome, Tyrosine --> melanin → Melanin Granules (Cytocrine secretion, living branches/bits of cell are pushed into keratinocytes) → Melanosome Complex Darker skin = more complexes lasting longer, granules in several layers → Cap over keratinocyte nucleus
- Freckle= skin w more melanin granules
- Clear cell in histology → NO desmosomes, shrinks with space around it
- 2 Types UV rays
  - UVA 400-320 nm, long → Increased tanning, wrinking, sagging, cancer risk
  - UVB 320-290 nm, short → Causes sunburn, induces inflammation in BV of dermis; 1000x more damaging to DNA

All races same # cells → Differing rate and # of melanin GRANULES

3. Langerhans Cells (Dendritic Cells)
- Stratum Spinosum
- Bone marrow derived → DEVO: arise from bone marrow and enter epidermis by week 4, fully differentiated by 12-14 wks
- Immune system cells → Antigen presenting → Mobile, focal contacts, no desmosomes

4. Merkel Cell
- Stratum basale → Deep to keratinocytes
- Neural Crest cell derived
- Innervated by single nerve process → Slow adapting cutaneous mechanoreceptors, Light touch
- NO catecholamines